IN THE CLAIMS

1. (Currently Amended) ~~Polyphase~~ A polyphase filter ~~consisting of~~ having N branch allpass filters of order x · N ~~to~~ that filter an input signal ~~t(k)~~, ~~characterized by~~ said polyphase filter comprising:

[[-]] a structure of an allpass filter of order x comprising delay elements with a delay of 1 and at least one multiplier, wherein all the delay elements with ~~a~~ the delay of 1 are replaced by delay elements with a delay of N in order to decrease a sampling rate of each of the N branch allpass filters of order x · N, ~~and~~

[[-]] ~~a~~ wherein the sampling rate $fS' = fs/N$, with fs being the sampling rate of the input signal, ~~(t(k))~~ for each of the N branch allpass filters of order x · N, where x is an integer number and N is a decimation factor of the polyphase filter; and

wherein said polyphase filter increases a number of Intermediate Frequencies (IF) utilized in selecting the sampling frequency.

2. (Currently Amended) ~~Filter~~ The filter according to claim 1, ~~characterized in that~~ wherein each of said at least one multiplier ~~respectively~~ comprises N time-multiplexed multiplication coefficients ~~(ap, ..., aN_1; xo, ..., xN-1)~~ that are used in a predetermined order ~~(a(k)= a(k mod N); iC(k)= x(k mod N))~~.

3. (Currently Amended) ~~Filter~~ The filter according to claim 1, ~~characterized by:~~ further comprising:

[[-]] a first delay element ~~(1)~~ with ~~a~~ the delay of N that receives the input signal ~~(t(k))~~;

[[-]] a first adder ~~(3)~~ that receives ~~the~~ an output signal of said first delay element ~~(1)~~ at a first input for ~~the~~ a first summand;

[[-]] a second delay element ~~(2)~~ with ~~a~~ the delay of N that receives ~~the~~ a sum produced by said first adder ~~(3)~~;

[[-]] a first subtracter ~~(4)~~ that receives the input signal ~~(t(k))~~ at ~~a~~ the first input for ~~the~~ a minuend and the output signal of the second delay element ~~(2)~~ at a second input for ~~the~~ a subtrahend; and

[[-]] a first multiplier ~~(5)~~ that receives ~~the~~ a calculated difference of the first subtracter ~~(4)~~, multiplies ~~it respectively~~ said first subtracter with a predetermined multiplication coefficient ~~(aak))~~ and outputs ~~the~~ a calculated product to ~~a~~ the second input of the first adder ~~(3)~~ that receives ~~the~~ a second summand, wherein

[[-]] in case x equals to 1 the sum produced by said first adder ~~(3)~~ builds the output signal ~~(u(k))~~ out of the branch allpass filters.

4. (Currently Amended) ~~Filter~~ The filter according to claim 3, ~~characterized by:~~ further comprising:

[[-]] a second adder ~~(6)~~ that receives the output signal of the second delay element ~~(2)~~ at ~~a~~ the first input for the first summand;

[[-]] a third delay element ~~(7)~~ with ~~a~~ the delay of N that receives the sum produced by said second adder ~~(6)~~;

[[-]] a second subtracter ~~(8)~~ that receives the sum produced by said first adder ~~(3)~~ at ~~a~~ the first input for the minuend and the output signal of the third delay element ~~(7)~~ at ~~a~~ the second input for the subtrahend; and

[[-]] a second multiplier ~~(9)~~ that receives the calculated difference of the second subtracter ~~(8)~~, multiplies ~~it respectively~~ said second subtracter with a predetermined multiplication coefficient ~~(x(k))~~ and outputs the calculated product to ~~a~~ the second input of the second adder ~~(6)~~ that receives the second summand, wherein

[[-]] in case x equals to 2 the sum produced by said second adder ~~(6)~~ builds the output signal ~~(u(k))~~ out of the branch allpass filters.

5. (Currently Amended) ~~Filter~~ The filter according to claim 2, ~~characterized in that every one of said at least one multipliers (5, 9)~~ wherein each of said at least one multiplier has ~~quantised~~ quantized coefficients so that ~~it can be realised~~ each of said at least one multiplier is realized by at least one shift register, at least one adder or at least one subtracter.

6. (Currently Amended) ~~Filter~~ The filter according to claim 5, ~~characterized in that one multiplier (5, 9)~~ wherein each of said at least one multiplier comprises:

[[-]] a first shift register ~~(10) having~~ that has a shift value of 2 [[2]] and that ~~is receiving the~~ receives a multiplicand and,

[[-]] an input selector switch ~~(S2) receiving the~~ that receives an output value of said first shift register ~~(10)~~ at a first fixed input terminal and the multiplicand at a second fixed input terminal,

[[-]] a second shift register ~~(11)~~, a third shift register ~~(12)~~ and a fourth shift register ~~(13)~~ ~~each having its~~ , an input of each of the second, third and fourth shift registers being connected to ~~the~~ a moveable output terminal of said input selector switch ~~(S2)~~.

[[-]] a third subtracter ~~(14) receiving~~ that receives the output value of said second shift register ~~(11)~~ at ~~a~~ the first fixed input terminal receiving ~~the~~ a minuend,

[[-]] a first output selector switch ~~(S3)~~ having ~~its~~ a moveable input terminal connected to ~~the~~ an output of said third shift register ~~(12), its first fixed output terminal runs free~~ and ~~its~~ the second fixed output terminal is connected to a second input of the third subtracter ~~(14) receiving~~ ~~the~~ that receives a subtrahend,

[[-]] a third adder ~~(15) receiving~~ that receives the output value of said third subtracter ~~(14) at a first input receiving the~~ and that receives a first summand, and ~~outputting~~ outputs the multiplied multiplicand,

[[-]] a second output selector switch ~~(S4)~~ having ~~its~~ a moveable input terminal connected to ~~the~~ an output of said fourth shift register ~~(13), its first fixed output terminal runs free~~ and ~~its~~ the second fixed output terminal is connected to a second input of the third adder ~~(15) receiving~~ ~~the~~ that receives a second summand.

7. (Currently Amended) ~~Filter~~ The filter according to claim 1, ~~**characterized in that a**~~ wherein the polyphase filter of order $x \cdot N$ with $x = a$ is ~~realised~~ realized in a time multiplex and works with a clock frequency $fc = a \cdot fs$, where x and a are integer numbers.

8. (Currently Amended) An IQ-generator~~, characterized in that an incoming sampled bandpass signal s(k) gets multiplied~~ comprising:

a multiplier for multiplying an incoming sampled bandpass signal by a signal A(k)=(-1)floor (k/N) ~~before being supplied as input signal t(k) to~~ and outputting a signal t(k); and

a polyphase filter ~~consisting of~~ having N branch allpass filters ~~(22)~~ of order x · N, having an input coupled to the output of said multiplier, and having a sampling frequency, where k is an input value, N is a decimation factor of the polyphase filter, x is an integer number, A(k) is a first signal and floor(x) is the greatest integer function, which gives the largest integer less than or equal to x; and

wherein said polyphase filter increases a number of Intermediate Frequencies (IF) utilized in selecting the sampling frequency.

9. (Currently Amended) An IQ-generator according to claim 8, ~~characterized in that~~ wherein the output signal of the polyphase filter having branch allpass filters ~~(22) gets~~ is multiplied by a signal B(k) · cos(2πfo/fs · k) to calculate ~~the~~ an I-component of ~~the~~ a complex baseband signal and by a signal B(k) · sin(2πfo/fs · k) to calculate ~~the~~ a Q-component of the complex baseband signal with A(k)=B(k)=(-1)floor(k/n), where fs is the sampling frequency, fo is a center frequency of the input signal, n is an integer number in the range of [-N/2…N/2] and B(k) is a second signal.

10. (Currently Amended) An IQ-generator ~~in which an~~ according to claim 8, wherein the incoming sampled bandpass signal ~~s(k) gets~~ is multiplied by ~~a~~ the signal A(k)=(-1)floor (k/N) before being supplied as the input signal ~~t(k)~~ to ~~a~~ the polyphase filter consisting of N branch allpass filters of order x · N, ~~**characterized by one**~~ wherein the polyphase filter ~~according to claim 1 to filter~~ ~~the~~ filters an I-component and ~~the~~ a Q-component of a complex baseband signal.